SOME GERMAN PUBLIC LABORATORIES.

In considering the success of German manufactures we are doubtless justified in regarding education as the ultimate cause. But proximate causes are also worth noting, and among these is the facility of access to the fountain-head of science enjoyed by German manufacturers. In England, as elsewhere, a manufacturer hesitates to take scientific experts into his employ unless his industry be on rather a large scale, but in Germany, at any rate, he has for some time been able to acquire the very best of scientific aid, as it were, retail. This fact is brought home by a study of some of the German industrial testing stations recently published by M. A. Granger in the *Bulletin* de la Société d'Encouragement.

The first of these institutions on M. Granger's list is also the most interesting, since it is not a State creation, but rests, in essence, on the historically English basis of cooperation. The laboratory of the Tonindustrie Zeitung in Berlin, together with the journal from which it takes its name, thrives upon the support of nine associations of manufacturers turning out pottery, cement, builders' materials, &c. It is housed in an admirably planned building of three stories, of which the uppermost is set apart for the business of the Zeitung. The laboratories are designed for the study of such goods as bricks and tiles, terracotta, fireclay, earthenware, porcelain, and cement, and their primaries. The clays serving as raw materials are subjected to elutriation, to determinations of plasticity, porosity, and fusibility, and to chemical analysis. In another department they are experimentally baked; here also Seger's cones are made and furnace gases analysed. The testing of cements includes rate of hardening, variation of volume, resistance to hammering, and tensile strength. Manufactured articles, finally, undergo tests for mechanical strength and for resistance to abrasion.

The laboratory is entirely at the service of manufacturers not only for tests, but also for investigations, including geological prospecting. To round off its completeness, it carries on a patent agency and an instrument business. Altogether some fifty persons are employed.

Better known to the world at large is the Kgl. Mechanisch-Technische Versuchs-Anstalt of Charlottenburg, now removing to the remoter suburb of Gross-Lichterfelde. Founded by ordinances of the Prussian Government in 1880 and 1882, it performs investigations and tests for the various Government departments (including railways) and for private clients. There are four departments, with a supreme director. The metals department is equipped for all the usual engineers' tests and for photographic metallography; its chief glories are a 500 ton horizontal testing machine by Hoppe, and a machine for crushing tests, of which the monkey weighs 600 kg. and falls through 10 metres. The other departments are concerned with builders' materials, papers and textiles, and lubricants respectively. The paper testing of the Versuchs-Anstalt is, perhaps, the best of its kind; its methods have been rendered familiar by the book of Dr. Hertzberg, the head of the department.

M. Granger further mentions the Kgl. Chemisch-Technische V.-A. in central Berlin, which is also kept up by the Prussian Government. It appears to be practically a commercial analyst's laboratory on the large scale. The well known Physikalisch-Technische Reichsanstalt of Charlottenburg owes its maintenance not to Prussia, but to the Empire.

In this, as in other respects, Bavaria declines to stand by whilst Prussia makes the running. Since 1891, we learn, there have been a Material-Prüfungs-Anstalt and a Chem.-Techn. V.-A. in Nuremberg, both State institutions; though on a comparatively small scale, they are in a flourishing way, and are business-like enough to charge lower fees than their Prussian analogues.

W. A. C.

DR. G. J. ALLMAN, F.R.S.

George Johnston Allman was born in Dublin in the year 1824, the son of Dr. William Allman, who was professor of botany in the University of Dublin from 1809 until 1844. He entered Trinity College at an early age, and at the honour degree examination he obtained senior moderatorship and a gold medal in mathematics in the year 1843. He was thus a contemporary of Samuel Haughton, who was first senior moderator in Dr. Allman's year, and of Sir Thomas Moffett, with whom he was so long associated in Galway. Early in the 'fifties Dr. Allman was elected to the professorship of mathematics in Queen's College, Galway, one of the colleges affiliated to the then recently constituted Queen's University in Ireland, and at Galway he remained until the close of his long life. Soon after the foundation of the Royal University in place of the Queen's University, Dr. Allman was nominated one of the senators by the Crown—a signal testimony to the high reputation he had made among his friends and colleagues in the Queen's University. He held his professorship for nearly forty years, when he was obliged to retire in accordance with the Civil Service regulations respecting the age limit.

Dr. Allman's most remarkable mathematical works relate to the paraboloids (on some properties of the paraboloids, *Quarterly Journal of Mathematics,* 1874) and to the history of Greek mathematics. During the years 1877–87 he published a series of papers in Hermathena which formed the basis of his celebrated work, "Greek Geometry from Thales to Euclid" (Dublin University Press Series). He also wrote the articles in the ninth edition of the "Encyclopædia Britannica" on Ptolemy, Pythagoras and Thales. In 1884 he was elected a Fellow of the Royal Society.

Like his class-fellow, Dr. Haughton, Allman was much interested in natural history, especially in the collection and study of sea-shells. He was fond of chess, and though perhaps he would hardly have called himself a mountaineer, he thoroughly enjoyed a ramble in some mountainous district and had full experience of the fascination the mountains have exerted over so many men of science.

NOTES.

The delegates attending the assembly of the International Association of Academies were entertained by the Royal Society at a banquet at the Hôtel Métropole on Tuesday. Sir William Huggins, president of the society, occupied the chair. Lord Goschen, in proposing the toast of the evening, "The International Association of Academies," said that a hundred years ago the metaphysical interests seemed to predominate over the interests of physical science, but the conditions were now entirely reversed, and it seemed as if physical science were going to rule the world. Nations seemed to look to physical sciences as if on them their prosperity depended, and the nation which paid the greatest homage to physical sciences would be the nation which would win among the nations of the universe. But might he put in a plea at the same time for the moral and metaphysical and the political sciences? He was glad to think that in most of the academies there was a section of the moral and political sciences side by side with the physical sciences, but they could not achieve the same striking results. He thought it highly desirable that side by side with physical sciences the societies which devoted themselves to moral and political sciences should be able to hold their own, and he appealed to the representatives of those academies to try to vie in energy and in determination to succeed with those who represented physical science alone. Replying to the toast, the Comte de Franqueville remarked that science belonged to no country, and was essentially the patriotism of humanity. Every scientific discovery, every conviction, every step of progress, whoever the author might be, in whatever country it took place, was spreading to every land like the beams of the sun illuminating the worlds. It was natural that all should contribute to that which should be a profit to all; to individual efforts and labours they gave a common impetus, in grouping and classifying the numerous problems which humanity had not yet solved.

Sir William Huggins, K.C.B., has been elected a foreign associate of the U.S. National Academy of Sciences; and also an honorary member of the Royal Philosophical Society of Glasgow.

The *Times* correspondent at Colombo announces that Dr. Castellani has discovered the bacillus of dysentery, and will shortly read a paper upon the subject before the Medical Association.

The *Globe* reports that Dr. Gottfried Merzbacher, who has been engaged for two years on a scientific expedition in the Thian-shan Mountains, in Central Asia, has returned to Munich with many objects of geological, palæontological, zoological and botanical interest.

A Reuter telegram from Malta states that a slight shock of earthquake was felt there at 6.13 a.m. on May 21.

A Reuter message from Copenhagen, dated May 21, states that the Danish scientific expedition to Greenland has arrived in the Danish colony of West Greenland, and reports that the Gjoea expedition, which started in August of last year, was found at Dalrymple Rock. All the members of both expeditions are well.

We learn from the *British Medical Journal* that the International Congress of Physiologists will hold its sixth meeting at Brussels this year from August 30 to September 3. All communications relative to the congress should be addressed to Dr. Slosse, Institut Solvay, Parc Leopold, Brussels, before July 1.

The annual meeting and conversazione of the Selborne Society will be held at the Civil Service Commission, Burlington Gardens, to-morrow, May 27. Lord Avebury, the president of the society, will give an address. There will also be a lecture, by Prof. B. H. Bentley, on "Flowers and their Insect Visitors," and one by Mr. Fred Enoch on "Colour Photography of Living Insects."

We have received from the secretary of the Library Association a report of the proceedings of the committee of the Library Association on binding leathers. We notice that more than sixty institutions have undertaken to try the new leathers prepared—in accordance with the recommendations of the committee appointed by the Society of Arts—to obviate the rapid deterioration of book-binding leathers. It is hoped that British producers will take care to prepare the light leathers specified.

At a sale recently held by Mr. Stevens in King Street, Covent Garden, a great auk's egg in fine condition was sold for two hundred guineas, the purchaser being Mr. Pax. This is a considerable falling-off from the three hundred guineas obtained for the last specimen sold by Mr. Stevens, the reason being attributed to the fact that several other fine examples are in the market. Mr. Pax's specimen was originally bought for two sovereigns. The next highest price obtained at the recent sale was 8*l*. 18*s*. 6*d*. for a clutch of four eggs of Bonaparte's sandpiper. For a single egg, the highest price was 27*s*. 6*d*. for one of Pallas's sand-grouse.

Mr. A. W. McCurdy, at a recent meeting of the Canadian Institute, gave an account of his invention of the device for developing photographs without a dark room, now so well known as the Kodak developing machine. It appears that his first idea was to use one solution that would both develop and fix, containing pyrocatechin as the developer. He afterwards employed a combined developer and fixer containing pyrogallol and sodium carbonate to avoid the troublesome caustic alkali. But separate developing and fixing solutions have always been recommended by the commercial makers of the apparatus, doubtless because of the greater certainty when the operations are individually controlled.

The death is announced of Mr. J. N. Tata, the millionaire philanthropist of Bombay. A correspondent of the *Times* points out that Mr. Tata made experiments extending over a series of years for the acclimatisation of Egyptian cotton in India, and in suitable localities these met with some measure of success. In many other directions, notably that of sericulture after the Japanese method in Mysore, the extension of the use of artesian wells and the introduction of cold storage, Mr. Tata contributed to the industrial expansion of the country of his birth. Mr. Tata, by means of his scholarships, tenable by Indian youths of special promise in this country as well as on the Continent and in America, afforded many of his young fellow-countrymen exceptional opportunities for gaining technical knowledge. The Indian University of Research, to be created at Bangalore as the outcome of his offer of an endowment of 200,000*l*., will be the monument of his beneficent career.

In the death of Mr. Frank Rutley, geological science has lost an enthusiastic worker on rocks and rock-forming minerals—one of the earlier investigators who brought the microscope to bear on petrological studies. His interest in geology was kindled at the Royal School of Mines, but he served as lieutenant in the army for a few years before 1867, when he joined the staff of the Geological Survey under Murchison. After carrying on field work for a time in the Lake District, he began to devote his special attention to the study of igneous rocks, and was transferred to the office in Jermyn Street, where he laboured for a number of years as acting petrologist. In 1876 he described the volcanic rocks of east Somerset and the Bristol district, and subsequently wrote memoirs on the eruptive rocks of Brent Tor and on the felsitic lavas of England and Wales. He was the author of the first English text-book of petrology, "The Study of Rocks" (1879), also of "Rock-forming Minerals" (1888) and "Granites and Greenstones" (1894). He likewise published a very useful handy book of mineralogy which passed through several editions. To the Geological Society he communicated papers relating to perlitic and spherulitic structures, fulgurites, novaculites, &c., and a special memoir on the rocks of the Malvern Hills. In 1881 the Murchison fund was awarded to him by the council of the society. He resigned his post on the Geological Survey in 1882, when he was appointed lecturer on mineralogy in the Royal School of Mines (afterwards merged in the Royal College of Science). A few years ago he was stricken down with paralysis, and was forced to retire from the public service; but he laboured on as far as his strength permitted with wonderful patience and interest, animated by a cheery nature, and he was able to accomplish much useful work until within about two years of his decease.

We are glad to find that the study of the meteorological conditions of the Transvaal and Orange River Colony has been taken up seriously by the respective Governments. With regard to the service in the Transvaal, we find some interesting particulars given in *Symons's Meteorological Magazine* for May. The director of the service is Mr. R. T. A. Innes, and the central observatory, which is three miles north-east of Johannesburg, stands at a height of about 5900 feet above sea-level. The grounds cover $10\frac{1}{2}$ acres, and were obtained partly by purchase and partly by gift of a Dutch family named Bezuidenhout. There are already 200 rainfall stations in operation, in addition to about 30 stations of the second and third orders. All the rainfall observers have come forward voluntarily, many of them being farmers and school teachers in thinly populated districts. A weather report is already issued daily, based on observations received by telegraph, and self-recording instruments are on the way to South Africa, and will probably be in working order by the beginning of July.

Messrs. D. Schulte and Co. have submitted a sample of their self-lighting Bunsen burner, in which the well known property of finely divided platinum igniting under the influence of a stream of hydrogen is employed. The burner proper is of the usual type, but is furnished with a byepass tube at the side, controlled by a cross stopcock. At the top of the byepass, close to the open end of the burner, there is fitted a small bracket holding the bundle of several fine platinum filaments, so constructed that the thin stream of gas from the byepass tube impinges on the stretched wires. A movable metal hood fits over the lighter to direct the pilot flame produced by the action of the platinum to the Bunsen tube, and on turning the stopcock to give full supply, the burner is lighted. The arrangement works very readily, and if the old difficulties with regard to the durability of the delicate portions can be surmounted, the apparatus should be of considerable convenience to laboratory workers.

In the *Bulletin* of the Johns Hopkins Hospital for March (vol. xv., No. 156), Dr. Eugene Opie writes on the relation of leucocytes with eosinophile granulation to bacterial infection, finding that they are attracted from the blood to the site of the bacterial invasion. Dr. Thomas McCrae gives an interesting biographical notice of George Cheyne, an old London and Bath physician of the seventeenth century. The other papers are of purely medical interest.

The report of the Inter-Departmental Committee on the Model Course of Physical Exercises has recently been published. The committee was instructed "to examine the model course now in use, to judge how far it should be modified or supplemented, and to consider what principles should be followed, in order to render a model course, or courses, adaptable for the different ages and sexes of the children in public elementary schools." The conclusion arrived at is that the "model course" as at present in use is not completely satisfactory. An elaborate scheme of exercises, no less than 109 in number, has therefore been drafted, and should prove of considerable service to teachers and others.

Two papers on invertebrates have just been received. In the first Miss H. Richardson (*Proceedings* U.S. Nat. Mus., No. 1369) describes numerous new types of isopod crustaceans collected in Alaska and Hawaii. In the second, which is extracted from the *Mark Anniversary Volume*, Mr. J. H. Gerould discusses certain features in the embryology of the sipunculid annelids, dealing more especially with the structure and homology of the peculiar embryonal envelope and its amniotic cavities.

The Leishman-Donovan body or parasite has been the subject of a research by Lieut. Christophers (*Sc. Mem. of the Gov. of India*, No. 8). It is met with in India in patients suffering from chronic fever, cachexia, and enlarged spleen. It occurs as a small round or ovoid body $1\cdot5$ to $3\cdot5\mu$ in diameter, free or contained within the leucocytes in the liver and spleen and bone-marrow, but not in the muscles or in the peripheral blood. Christophers observed the parasites also in the arachnoid and in ulcers of the large intestine. He agrees with other British observers that the organism is not a *piroplasma*, as stated by Laveran.

In the April number of the *Journal* of the Quekett Microscopical Club (ix., No. 54), Mr. Julius Rheinberg directs attention to a point concerning the resolving power of a microscopical objective that has been overlooked. As is well known, the numerical aperture of an objective must be of a certain degree in order to resolve a number of equidistant points or lines, and it has been tacitly assumed that the same numerical aperture is required whether the number of lines be two, four, six, or a large number. If, however, there be only two lines, it will be found that they can be resolved with a numerical aperture sensibly less than that required to resolve a large number. The mathematical explanation has been given by Dr. Johnstone Stoney and by Lord Rayleigh.

Two *Bulletins* have been received from the Experiment Station of the Colorado Agricultural College. In the first Mr. Paddock deals with "crown gall," the name applied to irregular outgrowths which are formed just below the ground at the base of trees, principally fruit trees. It has been referred to the irritation set up by a slime-fungus, and Prof. Toumey has succeeded in developing galls by inoculation. The pamphlet by Mr. Blinn directs attention to the importance of careful selection of seed as illustrated in the case of the Canteloupe.

The movements of the stomata of leaves is a subject of which Mr. F. Darwin, F.R.S., has made a special study, and the latest paper published in the *Botanical Gazette* furnishes an account of observations made with a Callendar recorder, which is a form of resistance thermometer. Platinum wires are arranged in a zig-zag on plates of talc, and two of these act as "bulbs" against which the leaves are pressed. In general, a withered leaf is used as a control. The results agree with those obtained with the horn hygroscope, and, to quote one instance, the curve produced by severing a leaf shows very clearly the preliminary opening followed by a gradual closing of the stomata.

"Insects Injurious to Fruits in Michigan" is the title of an illustrated *Bulletin* issued by the Agricultural College of that State.

In the course of a paper on metabolism and division in the Protozoa, published in the *Proceedings* of the American Academy, Mr. A. W. Peters points out the important influence exercised by the particular salt contained in the water on the growth and normal action of free-living cells; cell division in the animalcule Stentor being both accelerated and modified in character by an excess of potassium chloride in a normal medium.

The London County Council is to be congratulated on the issue, at the price of one penny, of a handbook to the collection in the Horniman Museum at Forest Hill, arranged as an introduction to the study of animal life. Although some of the words and sentences are perhaps a little too technical for the class who will use it, the book forms an admirable guide to the general principles of zoology, and is an honest attempt to put them in a popular guise.

We have received the prospectus of what promises to be a very useful and interesting work, "The Animals of New Zealand," by Messrs. Hutton and Drummond. As it deals only with the air-breathing vertebrates of the colony and its coasts, the bulk of its contents will be devoted to birds. Another faunistic work on our table is the second part of the Boston Society's "Fauna of New England," containing the Batrachia, drawn up by Mr. S. Henshaw.

The contents of the February number of the *American Naturalist* are restricted to four articles, of which three are devoted to the lower vertebrates. In the first, Prof. H. F. Osborn emphasises in popular language his views with regard to the classification of reptiles, in the course of which he urges the propriety of forming families on phylogenetic lines. He would, for instance, include the Eocene Hyracotherium in the horse family (Equidæ), while a closely allied contemporaneous genus is included among the tapirs. The early stages in the development of an American salamander (*Desmognathus fuscus*) form the subject of a communication by Prof. Wilder, while Miss Townsend discusses the histology of the light-organs of the fire-fly *Photinus marginellus*. Apparently the author accepts the view that the latter organs are modified fat-bodies. Finally, Mr. E. G. Mitchell points out the relation of the breathing valves in the mouths of bony fishes to the shape of the mouth itself.

A useful summary of the metalliferous mining in Ireland has been contributed by Mr. G. H. Kinahan to the *Transactions* of the Institution of Mining Engineers.

We have received the annual report of Mr. H. B. Kümmel, State Geologist of New Jersey. It includes accounts of floods, forest fires, and underground waters, and reports on iron, zinc and copper mining, and on the Portland cement industry.

We have received the *Transactions* of the Geological Society of South Africa, vol. vi., parts i. to vi., a well illustrated and clearly printed volume, dealing, as might be expected, largely with the metalliferous and coal deposits, and also with petrological questions. Mr. J. P. Johnson contributes a paper on the discovery of implement-bearing deposits in the neighbourhood of Johannesburg. In high-level drift near Roodekop Farm he has found water-worn implements of quartzite of Eolithic type, much resembling those of the plateau gravel of the Thames basin. At lower levels, along the bottom of the Bezuidenhout valley, he obtained implements of Palæolithic type, the deposits being evidently of later date than the high-level drift. Elsewhere he has found implements of Neolithic type. In his opinion the facts indicate that "South Africa saw much the same evolution in the culture of its Stone age as did that of the Thames basin and the rest of Britain and Western Europe." The fossil flora of Vereeniging is treated of by Mr. T. N. Leslie, who, aided by the researches of Mr. A. C. Seward, gives revised lists of the plant remains from the Permo-Carboniferous strata.

The Permian fossils of the central Himalayas are described by Dr. Carl Diener (*Mem.* Geol. Survey India, series xv., vol. i., part v., 1903). In previous parts of this volume, Nos. 2 to 4, the fossils obtained by the Geological Survey up to the year 1893 from the "Anthracolithic series" (Permian portion) were described. In the present work Dr. Diener deals with specimens collected during the years 1898–1900. Under this method the fossils are treated according to their stratigraphical horizon and locality. The localities include Chitichun, Malla Sangcha, the Lissar Valley, Byans, and Spiti. In Spiti the Anthracolithic system is divided into two groups separated by a great unconformity—the upper group is regarded as Permian, and the lower as of Upper Carboniferous age. In the Permian system, to which attention is now directed, two facies are recognised in the Himalayas, and these differ in lithological and faunistic characters. One facies is represented by the white and red limestones of Chitichun and Malla Sangcha, and it corresponds with the topmost zone of the middle Productus limestone of the Salt Range and with the Tibetan series. In the other facies, developed in the main region of the Central Himalayas, the Permian strata comprise dark shales and calcareous sandstones; the fauna is composed of cephalopods, lamellibranchs, gasteropods and brachiopods, while corals and Bryozoa are wanting, and the majority of the leading fossils are autochthonous species, none of which has been found outside the Himalayas. Only a small percentage of species is identical with Salt Range forms, and the affinities with the Tibetan facies are less distinctly marked.

The account of the genus Diospyros, contributed by Mr. H. Wright to the *Annals* of the Royal Botanic Gardens, Peradeniya, constitutes a monograph of the Ceylon species. *Diospyros Ebenum*, which is the main source of ebony-wood in Ceylon, is found both in the dry and wet regions of the island, and is considered to be ready for felling when the tree has attained a breast-height circumference of 9 feet. The different species vary considerably in the colour of their heart-wood; in *D. Ebenum* the black heart-wood owes its colour mainly to chemical and physical changes of the materials stored in the elements of the wood, and to a less degree to a change in composition and colour of the cell walls. Considerable variation occurs also in the types of flowers, and in *D. Ebenum* the flowers may be diœcious, monœcious, or polygamous.

In the *Proceedings* of the Royal Dublin Society, Dr. T. Johnson describes a fungal disease which was found upon the willows known as "black mauls" growing in osier beds in Connemara, and identifies the fungus as *Physalospora gregarina*, a member of the Sphæriaceæ. The willows were growing on poor and sour land, and owing to their impoverished condition were especially liable to the attacks of the fungus.

The development of scientific investigation and methods in connection with the agriculture of the West Indies has been a prominent feature in the policy of Sir D. Morris, the Commissioner of Agriculture, and an instance of the valuable work which is being carried on is furnished by the reports on sugar cane experiments which have been conducted at Antigua and St. Kitts under the superintendence of Mr. F. Watts. The first part deals with the cultivation of selected varieties of canes grown in the same way as the ordinary crops on the estate. The Barbados seedling B. 208 again heads the list, both in the matter of providing the heaviest canes and producing the purest juice; at the same time it retains its excellent character as a ratoon cane. Another set of experiments, continuing the work of former years, deals with the question of manuring. The evidence is opposed to the value of artificial manures for plant canes when the land has been well prepared with pen manure, but for obtaining maximum crops with ratoons the addition of nitrogenous salts is necessary.

THE first part of vol. i. of the new series of the *Transactions* of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne has now been issued. Among other interesting contents may be noticed "Notes on Entomostraca Found at the Roots of Laminariæ," by Dr. G. S. Brady, F.R.S., and papers by Mr. Clephan on ancient Egypt, and by Mr. Alex. Meek on the fishes of the north-east coast.

THE seventieth annual report of the Bootham School (York) Natural History, Literary, and Polytechnic Society, a copy of which has been received, affords abundant evidence of the importance attached by the masters of this school to the development in boys of an interest in practical work in science and in open-air study of natural phenomena. The report should be seen by science masters in secondary schools where little is done to create and foster interest in personal observations of nature.

THE British Fire Prevention Committee has issued, as number eighty-one in its series of publications, a descriptive paper by Mr. Edwin O. Sachs on the fire at the Iroquois Theatre, Chicago, on December 30, 1903. The publication also contains the new theatre regulations at Chicago, and notes on constructional particulars by the U.S.A. National Fire Protection Association. It appears that the stage of the Iroquois Theatre was of the ordinary type with the usual wood equipment. The stage accessories, scenery, properties, &c., were of the ordinary highly inflammable character, and had been in use for a considerable time, which involved the usual fraying and high grade of inflammability. The electric arc lamps used on the stage were not properly enclosed or suitably protected, and the fire appliances and exits were equally unsatisfactory. Mr. Sachs, after reviewing the whole circumstances of the fire, gives a number of general conclusions which deserve attention. He insists that fire prevention on the stage—where the Iroquois fire originated—can only be obtained by suitable incombustible construction and equipment. The scenery, properties, and furnishings of the stage must be thoroughly impregnated, so that they do not catch or spread fire by any spark or flame. When it is remembered that this Chicago fire resulted in 572 deaths, it is not too much to demand that city authorities should make the best use of the means provided by science to prevent such outbreaks of fire.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JUNE:—

June 1.	12h. Jupiter in perihelion.
5.	Ceres in opposition to the Sun. Ceres mag. 7·4.
,,	14h. 13m. to 16h. 30m. Transit of Jupiter's Sat. III. (Ganymede).
8.	8h. Mercury at greatest elongation, 23° 46′ W.
9.	12h. 34m. Minimum of Algol (β Persei).
12.	9h. 23m. ,, ,, ,,
June 15.	Venus. Illuminated portion of disc = 0·994, of Mars = 0·999.
18.	Saturn. Major axis of ring = 41″·62. Minor axis = 9″·73.
19.	5h. Uranus in opposition to the Sun.
24.	11h. 55m. to 12h. 30m. Moon occults θ Libræ (mag. 4·3).
29.	17h. Venus in conjunction with Neptune, ♀ 1° 24′ N.

COMET 1904 *a*.—In No. 3947 of the *Astronomische Nachrichten*, Prof. Strömgren publishes a new set of parabolic elements, and a daily ephemeris extending from May 18 to June 19, for comet 1904 *a*. The following is taken from his ephemeris:—

12*h*. (*M.T. Berlin*).

1904		α			δ		log *r*	log Δ	Brightness
		h.	m.	s.	°	′			
May 26	...	14	17	17	+58	9	0·4534	0·4033	0·72
,, 30	...	14	0	55	+58	4	0·4554	0·4136	0·68
June 3	...	13	45	51	+57	48	0·4576	0·4241	0·64
,, 7	...	13	32	15	+57	22	0·4598	0·4349	0·61
,, 11	...	13	20	8	+56	49	0·4621	0·4457	0·57
,, 15	...	13	9	27	+56	11	0·4644	0·4564	0·54
,, 19	...	13	0	10	+55	29	0·4668	0·4671	0·51

In No. 3946 of the same journal, Prof. Pickering reports that on a spectrogram taken with an objective prism at the Harvard College Observatory on April 16, the nearly continuous spectrum shows a slight increase of intensity at two points, the distribution of the light being the same as that recorded on a similar spectrogram of comet 1898 VII.

The comet was independently discovered by M. Lucien Rudaux at his private observatory at Donville (Manche) on April 16. Using a portrait lens of 4 cm. aperture, he photographed the region about the nebula M92 with an exposure lasting from 10h. 15m. to 10h. 45m. (Paris M.T.), about 4 hours before Mr. Brooks discovered the comet at Geneva (U.S.A.). On developing the plate he discovered an unknown nebulous patch to the north of the nebula, but cloudy weather prevented him from confirming his discovery (*Astronomische Nachrichten*, No. 3946).

THE STABILITY OF SOLAR SPECTRUM WAVE-LENGTHS.—In a paper published in No. 19 (1904) of the *Comptes rendus*, M. Hamy again refers to the apparent change of wave-length of the green cadmium line at λ 508, with the conditions under which the radiation is produced. He states that on increasing the temperature surrounding the vacuum tube from 295° to 310° C., the relative intensities of the single line and the doublet, referred to by Prof. Fabry (*Comptes rendus*, cxxxviii. p. 854), are considerably modified, so much so that the mean wave-length is appreciably altered.

He then suggests that a change of mean wave-length of this character may largely affect the stability of the wave-lengths of lines in the solar spectrum, because the conditions of radiation in the solar atmosphere are probably considerably modified during the various epochs of solar disturbance.

VARIABLE STAR OBSERVATIONS.—The variable star observations made at Rousdon by the late Sir Cuthbert Peek have been edited by Prof. H. H. Turner, and the work is now ready for press. At the meeting of the Royal Astronomical Society held on April 8, Prof. Turner stated that on subjecting the few available light curves to harmonic analysis, he found that the different harmonics appear to form a regular series. Another point of interest discovered was that on subjecting the sun-spot activity curve, obtained by plotting Wolf's numbers, to similar analysis, the coefficients fitted fairly well into the formulæ obtained from the Rousdon star variations if the sun-spot *maxima* be taken as corresponding to the variable star *maxima* (*Observatory*, No. 344).

PROVISIONAL RESULTS OF THE INTERNATIONAL LATITUDE SERVICE.—Prof. Albrecht publishes in No. 3945 of the *Astronomische Nachrichten* the provisional results obtained by the International Latitude Service during 1903–4. From a diagram and a table, which show the variation of the momentary pole from the position of the mean pole, it is seen that the amount of this variation increased during 1903, and is now probably near its maximum value.